

Amendments to the Claims:

Please cancel claims 1-181.

Please add the following new claims:

182. (New) A method for producing platform molecules comprising:

providing a first phenylene ring consisting essentially of a first functional group at a para- position to a first carboxylic group selected from the group consisting of carboxyl groups and reactive derivatives of carboxyl groups;

providing a second phenylene ring consisting essentially of a second functional group at a para- position to a second carboxylic group selected from the group consisting of carboxyl groups and reactive derivatives of carboxyl groups;

providing a third phenylene ring comprising a desired substituent and comprising a first functionality at a para- position to a second functionality; and

forming a mixture comprising said first phenylene rings, said second phenylene rings, and said third phenylene rings;

exposing said mixture to conditions effective to react said first carboxylic group with said first functionality to produce a first ester bond, said conditions being effective to react said second carboxylic group with said second functionality to produce a second ester bond, producing platform molecules comprising terminal groups comprising said first functional group at position para- to said first ester bond and said second functional group at a position para- to said second ester bond, said terminal groups comprising other than polymerizable groups, one or more of said terminal groups being selected from the group consisting of HO-(CH₂)_n-O- groups, Cl(CH₂)_n-O- groups, Br(CH₂)_n-O- groups, I(CH₂)_n-O-, and reactive derivatives thereof, wherein n is from about 2 to about 12 and CH₂ independently

is selected from the group consisting of CH_2 which is unsubstituted and CH_2 which is substituted by an element selected from the group consisting of oxygen, sulfur, and an ester group; provided that at least 2 carbon atoms separate said oxygen or said ester group; and,

wherein, when both of said terminal groups comprise polymerizable groups, said desired substituent provides sufficient steric hindrance to achieve a nematic state at room temperature while suppressing crystallinity at room temperature.

183. (New) The method of claim 182 further comprising producing one or more of said first phenylene ring and said second phenylene ring by a method comprising:

reacting nitrobenzoic acid with a 1, n-dihydroxyalkane comprising an alkylene group having from about 2 to about 12 carbon atoms in the presence of an esterification catalyst under conditions effective to produce a hydroxyalkyl ester of 4 nitrobenzoic acid;

treating the hydroxyalkyl ester of 4 nitrobenzoic acid under cleaving conditions effective to produce 4-(n-hydroxyalkoxy)benzoic acid comprising a nitrobenzoic carboxyl group, wherein n is the number of carbon atoms in said alkylene group; and

providing said 4-(n-hydroxyalkoxy)benzoic acid as one or more of said first phenylene ring and said second phenylene ring, one or more of said first carboxylic group and said second carboxylic group comprising said nitrobenzoic carboxyl group.

184. (New) The method of claim 183 further comprising converting said nitrobenzoic carboxyl group to a reactive derivative thereof before providing said 4-(n-hydroxyalkoxy)benzoic acid as one or more phenylene ring selected from the group consisting of said first phenylene ring and said second phenylene ring.

185. (New) The method of claim 184 wherein said converting said nitrobenzoic carboxyl

group to a reactive derivative thereof comprises reacting said 4-(n-hydroxyalkoxy)benzoic acid with thionyl chloride under conditions effective to produce 4-(n-chloroalkoxy)benzoyl chloride.

186. (New) The method of claim 182 further comprising reacting one or more of said terminal groups with a carboxyl group or a reactive derivative of a carboxyl group comprising a polymerizable group.

187. (New) The method of claim 184 further comprising reacting one or more of said terminal groups with a carboxyl group or a reactive derivative of a carboxyl group comprising a polymerizable group.

188. (New). The method of claim 182 wherein said desired substituent is selected from the group consisting of alkyl groups having from about 1 to 6 carbon atoms and aryl groups.

189. (New). The method of claim 184 wherein said desired substituent is selected from the group consisting of alkyl groups having from about 1 to 6 carbon atoms and aryl groups.

190. (New). The method of claim 188 wherein said first functional group and said second functional group comprise hydroxyl groups.

191. (New). The method of claim 189 wherein said first functional group and said second functional group comprise hydroxyl groups.

192. (New) The method of claim 182 further comprising:

forming an elongation mixture comprising said platform molecules and one or more additional phenylene rings comprising additional functional groups other than polymerizable groups at para- positions to additional carboxylic group(s) selected from the group consisting of carboxyl groups and reactive derivatives of carboxyl groups; and

exposing said elongation mixture to conditions effective to react one or more of said additional carboxylic group(s) with one or more of said terminal groups to produce

elongated platform molecules comprising additional phenylene rings comprising said additional functional group(s) at a position para- to additional ester bond(s).

193. (New) The method of claim 191 further comprising:

forming an elongation mixture comprising said platform molecules and one or more additional phenylene rings comprising additional functional groups other than polymerizable groups at para- positions to additional carboxylic group(s) selected from the group consisting of carboxyl groups and reactive derivatives of carboxyl groups; and

exposing said elongation mixture to conditions effective to react one or more of said additional carboxylic group(s) with one or more of said terminal groups to produce elongated platform molecules comprising additional phenylene rings comprising said additional functional group(s) at a position para- to additional ester bond(s).

194. (New) The method of claim 182 wherein one or more of said terminal groups comprises a group or reacted derivative thereof selected from the group consisting of hydroxyl groups, amino groups, sulfhydryl groups, and halogen atoms.

195. (New) A method for producing platform molecules comprising:

reacting 4-nitrobenzoic acid with a 1, n-dihydroxyalkane comprising an alkylene group having from about 2 to about 12 carbon atoms in the presence of an esterification catalyst under esterification conditions effective to produce a hydroxyalkyl ester of 4-nitrobenzoic acid;

treating the hydroxyalkyl ester of 4-nitrobenzoic acid under cleaving conditions effective to produce 4-(n-hydroxyalkoxy)benzoic acid, wherein n is the number of carbon atoms in said alkylene group;

providing said 4-(n-hydroxyalkoxy)benzoic acid as one or more of a phenylene ring

selected from the group consisting of a first phenylene ring comprising a first carboxylic group and a second phenylene ring comprising a second carboxylic group; providing a third phenylene ring comprising a desired substituent and comprising a first functionality at a para- position to a second functionality; reacting said first carboxylic group with said first functionality, producing a first ester bond; and reacting said second carboxylic group with said second functionality, producing a second ester bond, thereby producing platform molecules comprising a first hydroxyalkoxy group at position para- to said first ester bond and a second hydroxyalkoxy group at a position para- to said second ester bond, wherein, when both said first hydroxyalkoxy group and said second hydroxyalkoxy group comprise polymerizable groups, said desired substituent provides sufficient steric hindrance to achieve a nematic state at room temperature while suppressing crystallinity at room temperature.

196. (New) The method of claim 195 further comprising converting said nitrobenzoic carboxyl group to a reactive derivative thereof before reacting said first carboxylic group with said first functionality and before reacting said second carboxylic group with said second functionality.

197. (New) The method of claim 196 wherein said converting comprises converting 4-(n-hydroxyalkoxy)benzoic acid to 4-(n-chloroalkoxy)benzoyl chloride.

198. (New) The method of claim 195 further comprising reacting one or more of said first hydroxyalkoxy group and said second hydroxyalkoxy group with a carboxyl group or a reactive derivative of a carboxyl group comprising a polymerizable group.

199. (New). The method of claim 197 wherein said desired substituent is selected from the group consisting of alkyl groups having from about 1 to 6 carbon atoms and aryl groups.

200. (New) The method of claim 197 wherein said esterification conditions comprise dissolving said 4-nitrobenzoic acid in an excess of said 1, n-dihydroxyalkane in the presence of esterification catalyst selected from the group consisting of titanium alkoxides, tin alkoxides, and sulfonic acids.

201. (New) The method of claim 197 wherein said esterification catalyst is $\text{Ti}(\text{OBu})_4$.

202. (New) The method of claim 197 wherein said esterification conditions further comprise adding alkali salts of diols and solvent to produce a displacement mixture, and exposing said displacement mixture to displacement conditions effective to displace the activated nitro group, producing 4-(1-hydroxyalkoxy)benzoic acid (1-hydroxyalkyl ester) and dimer thereof.

203. (New) The method of claim 202 wherein said solvent is aprotic.

204. (New) The method of claim 202 wherein said solvent is selected from the group consisting of dimethyl sulfoxide (DMSO), dimethyl formamide (DMF), dimethyl acetamide (DMAC), hexamethyl phosphonamide (HMPA), N-methyl pyrrolidinone (NMP), and combinations thereof.

205. (New) The method of claim 202 wherein said solvent is dimethylsulfoxide (DMSO).

206. (New) The method of claim 202 wherein said alkali salt is selected from the group consisting of NaH or KOBU^t .

207. (New) The method of claim 202 further comprising diluting said displacement mixture with an aqueous base and heating the diluted

displacement mixture to cleave dimer to produce a cleaved solution comprising 4-(n-hydroxyalkoxy)benzoic acid;

acidifying said cleaved solution; and,

precipitating said 4-(n-hydroxyalkoxy)benzoic acid.

208. (New) The method of claim 207 wherein said precipitating produces a supernatant comprising sodium chloride and nitrite, said method further comprising recovering said sodium chloride and nitrite.

209. (New) The method of claim 207 wherein said recovering comprises vacuum evaporating solvent selected from the group consisting of DMSO, hexanediol, water, and combinations thereof.

210. (New) The method of claim 208 further comprising converting said nitrobenzoic carboxyl group to a reactive derivative thereof before reacting said first carboxylic group with said first functionality and before reacting said second carboxylic group with said second functionality.

211. (New) The method of claim 209 wherein said converting comprises converting said 4-(n-hydroxyalkoxy)benzoic acid to 4-(n-chloroalkoxy)benzoyl chloride.

212. (New) The method of claim 197 further comprising reacting said third phenylene ring with said 4-(n-chloroalkoxy)benzoyl chloride to produce said platform molecules.

213. (New) The method of claim 202 wherein said reacting conditions comprise mixing said 4-(n-chloroalkoxy)benzoyl chloride and said third phenylene ring with pyridine to produce a reaction mixture.

214. (New) The method of claim 213 further comprising crystallizing bis 1,4 [4"-(n-chloroalkoxy) benzoyloxy] t-butyl phenylene from said reaction mixture.

215. (New) The method of claim 214 further comprising hydrolyzing said bis 1,4 [4"-(n-chloroalkoxy) benzoyloxy] t-butyl phenylene and recovering said platform molecule.

216. (New) The method of claim 215 wherein said hydrolyzing comprises heating a solution of said bis 1,4 [4"-(n-chloroalkoxy) benzoyloxy] t-butyl phenylene in aprotic solvent in the presence of water and potassium bromide, producing a platform molecule solution.

217. (New) The method of claim 216 further comprising recrystallizing said platform molecules from said platform molecule solution.

218. (New) The method of claim 217 further comprising exchanging said 4-(n-chloroalkoxy)benzoyl chloride with iodine before reacting said 4-(n-chloroalkoxy)benzoyl chloride with said third phenylene rings.

219. (New) The method of claim 197 further comprising stopping said reacting at intermediate times to produce desired mixtures of monofunctional and difunctional alcohol molecules.

220. (New) The method of claim 207 further comprising reacting said third phenylene ring with said 4-(n-chloroalkoxy)benzoyl chloride under reacting conditions effective to produce said platform molecules.

221. (New) The method of claim 220 wherein said reacting conditions mixing said 4-(n-chloroalkoxy)benzoyl chloride and said third phenylene ring with pyridine to produce a reaction mixture.

222. (New) The method of claim 221 further comprising crystallizing bis 1,4 [4"-(n-chloroalkoxy) benzoyloxy] t-butyl phenylene from said reaction mixture.

223. (New) The method of claim 222 further comprising hydrolyzing said bis 1,4 [4"-(n-chloroalkoxy) benzoyloxy] t-butyl phenylene and recovering said platform molecule.

224. (New) The method of claim 223 wherein said hydrolyzing comprises heating a solution of said bis 1,4 [4"-(n-chloroalkoxy) benzoyloxy] t-butyl phenylene in aprotic solvent in the presence of water and potassium bromide, producing a platform molecule solution.

225. (New) The method of claim 224 further comprising recrystallizing said platform molecules from said platform molecule solution.

226. (New) The method of claim 225 further comprising exchanging said 4-(n-chloroalkoxy)benzoyl chloride with iodine before reacting said 4-(n-chloroalkoxy)benzoyl chloride with said third phenylene rings.

227. (New) A method for producing platform molecules comprising:

providing a first phenylene ring comprising a first functional group at a para-position to a first carboxylic group selected from the group consisting of carboxyl groups and reactive derivatives of carboxyl groups;

providing a second phenylene ring comprising a second functional group at a para-position to a second carboxylic group selected from the group consisting of carboxyl groups and reactive derivatives of carboxyl groups;

providing a third phenylene ring comprising a desired substituent and comprising a first functionality at a para- position to a second functionality; and

reacting said first functionality with said first carboxylic group, producing a first ester bond between said third phenylene ring and said first phenylene ring; and

reacting said second functionality with said second carboxylic group, producing a second ester bond, producing platform molecules comprising said first functional group at position para- to said first ester bond and said second functional group at a position para- to said second ester bond; and

forming an elongation mixture comprising one or more additional phenylene rings comprising additional functional groups other than polymerizable groups at para-position(s) to additional carboxylic group(s) selected from the group consisting of carboxyl groups and reactive derivatives of carboxyl groups; and

exposing said elongation mixture to conditions effective to react said additional carboxylic group(s) with one or more functional group selected from the group consisting of

said second functional group and said third functional group to produce elongated platform molecules comprising additional phenylene rings comprising said additional functional group(s) at a position para- to additional ester bond(s), said elongated platform molecules comprising terminal groups other than polymerizable groups, one or more of said terminal groups being selected from the group consisting of HO-(CH₂)_n-O- groups, Cl(CH₂)_n-O- groups, Br(CH₂)_n-O- groups, I(CH₂)_n-O-, and reactive derivatives thereof, wherein n is from about 2 to about 12 and CH₂ independently is selected from the group consisting of CH₂ which is unsubstituted and CH₂ which is substituted by an element selected from the group consisting of oxygen, sulfur, and an ester group; provided that at least 2 carbon atoms separate said oxygen or said ester group;

wherein, when both said first functional group and said second functional group comprise polymerizable groups, said desired substituent provides sufficient steric hindrance for said platform molecules to achieve a nematic state at room temperature while suppressing crystallinity at room temperature.

228. (New) The method of claim 227 further comprising producing one or more phenylene ring selected from the group consisting of said first phenylene ring, said second phenylene ring, and said one or more additional phenylene ring(s) by a method comprising:

reacting nitrobenzoic acid with a 1, n-dihydroxyalkane comprising an alkylene group having from about 2 to about 12 carbon atoms in the presence of an esterification catalyst under conditions effective to produce a hydroxyalkyl ester of 4 nitrobenzoic acid;

treating the hydroxyalkyl ester of 4 nitrobenzoic acid under cleaving conditions effective to produce 4-(n-hydroxyalkoxy)benzoic acid comprising a nitrobenzoic carboxyl

group, wherein n is the number of carbon atoms in said alkylene group; and providing said 4-(n-hydroxyalkoxy)benzoic acid as one or more of said first phenylene ring comprising said first carboxylic group, said second phenylene ring comprising said second carboxylic group, and said fourth phenylene ring comprising said third carboxylic group.

229. (New) The method of claim 228 further comprising converting said nitrobenzoic carboxyl group to a reactive derivative thereof before providing said 4-(n-hydroxyalkoxy)benzoic acid as one or more of said first phenylene ring comprising said first carboxylic group, said second phenylene ring comprising said second carboxylic group, and said fourth phenylene ring comprising said third carboxylic group.

230. (New) The method of claim 229 wherein said converting comprises converting said 4-(n-hydroxyalkoxy)benzoic acid to 4-(n-chloroalkoxy)benzoyl chloride.

231. (New) The method of claim 227 further comprising reacting both said first functional group and said third functional group with a carboxyl group or a reactive derivative of a carboxyl group comprising a polymerizable group.

232. (New) The method of claim 230 further comprising reacting both said first functional group and said third functional group with a carboxyl group or a reactive derivative of a carboxyl group comprising a polymerizable group.

233. (New). The method of claim 227 wherein said desired substituent is selected from the group consisting of alkyl groups having from about 1 to 6 carbon atoms and aryl groups.

234. (New). The method of claim 232 wherein said desired substituent is selected from the group consisting of alkyl groups having from about 1 to 6 carbon atoms and aryl groups.

235. (New). The method of claim 227 wherein said first functional group and said second functional group comprise hydroxyl groups.

236. (New) The method of claim 227 wherein one or more of said terminal groups comprises a group or reacted derivative thereof selected from the group consisting of amino groups, sulfhydryl groups, and halogen atoms.

237. (New) A method for producing platform molecules comprising:

providing a first phenylene ring comprising a first functional group at a para-position to a second functional group;

providing a second phenylene ring comprising a third functional group at a para- position to a fourth functional group;

providing a third phenylene ring comprising a desired substituent and comprising a first functionality at a para- position to a second functionality; and

forming a mixture comprising said first phenylene rings, said second phenylene rings, and said third phenylene rings;

exposing said mixture to conditions effective to react said second functional group with said first functionality to produce a first ester bond, said conditions being

effective to react said third functional group with said second functionality to

produce a second ester bond, producing platform molecules comprising terminal groups comprising said first functional group at position para- to said first ester

bond and said fourth functional group at a position para- to said second ester

bond, said conditions producing terminal groups comprising other than

polymerizable groups, one or more of said terminal groups comprising an alkoxy moiety selected from the group consisting of HO-(CH₂)_n-O- groups, Cl(CH₂)_n-O- groups, Br(CH₂)_n-O- groups, I(CH₂)_n-O-, and reactive derivatives thereof,

wherein n is from about 2 to about 12 and CH₂ independently is selected from the group consisting of CH₂ which is unsubstituted and CH₂ which is substituted by

an element selected from the group consisting of oxygen, sulfur, and an ester group; provided that at least 2 carbon atoms separate said oxygen or said ester group;

wherein, when both of the first functional group and the fourth functional group comprise polymerizable groups, said desired substituent provides sufficient steric hindrance to achieve a nematic state at room temperature while suppressing crystallinity at room temperature.

238. (New) The method of claim 237 further comprising producing one or more of said first phenylene ring and said second phenylene ring by a method comprising:

reacting nitrobenzoic acid with a 1, n-dihydroxyalkane comprising an alkylene group having from about 2 to about 12 carbon atoms in the presence of an esterification catalyst under conditions effective to produce a hydroxyalkyl ester of 4 nitrobenzoic acid;

treating the hydroxyalkyl ester of 4 nitrobenzoic acid under cleaving conditions effective to produce 4-(n-hydroxyalkoxy)benzoic acid comprising a nitrobenzoic carboxyl group, wherein n is the number of carbon atoms in said alkylene group; and providing said 4-(n-hydroxyalkoxy)benzoic acid as one or more of said first phenylene ring and said second phenylene ring, one or more of said second functional group and said third functional group comprising said nitrobenzoic carboxyl group.

239. (New) The method of claim 238 further comprising reacting one or more of said first functional group and said fourth functional group with a carboxyl group or a reactive derivative of a carboxyl group comprising a polymerizable group.

240. (New) The method of claim 238 further comprising reacting one or more of said first functional group and said fourth functional group with a carboxyl group or a reactive

derivative of a carboxyl group comprising a polymerizable group.

241. (New). The method of claim 237 wherein said desired substituent is selected from the group consisting of alkyl groups having from about 1 to 6 carbon atoms and aryl groups.

242. (New) The method of claim 237 further comprising:

forming an elongation mixture comprising said platform molecules and one or more additional phenylene rings comprising additional functional groups other than a polymerizable group at para- positions to additional carboxylic group(s) selected from the group consisting of carboxyl groups and reactive derivatives of carboxyl groups; and

exposing said elongation mixture to conditions effective to react said additional carboxylic group(s) with one or more of said terminal groups to produce elongated platform molecules comprising additional phenylene rings comprising said additional functional group(s) at a position para- to additional ester bond(s).

243. (New) The method of claim 237 wherein one or more of said terminal groups comprises a group or a reacted derivative thereof selected from the group consisting of hydroxyl groups, amino groups, sulfhydryl groups, and halogen atoms.

244. (New) A method for producing platform molecules comprising:

providing a first phenylene ring consisting essentially of a first functional group at a para- position to a second functional group;

providing a second phenylene ring consisting essentially of a third functional group at a para- position to a fourth functional group;

providing a third phenylene ring comprising a desired substituent and comprising a first functionality at a para- position to a second functionality; and

forming a mixture comprising said first phenylene rings, said second phenylene rings,

and said third phenylene rings;
exposing said mixture to conditions effective to react said second functional group with said first functionality to produce a first ester bond, said conditions being effective to react said third functional group with said second functionality to produce a second ester bond, thereby producing platform molecules comprising terminal groups comprising said first functional group at position para- to said first ester bond and said fourth functional group at a position para- to said second ester bond, said terminal groups comprising groups selected from the group consisting of amino groups, sulfhydryl groups, and halogen atoms;
wherein, when both the first functional group and the fourth functional group comprise polymerizable groups, said desired substituent provides sufficient steric hindrance to achieve a nematic state at room temperature while suppressing crystallinity at room temperature.

245. (New). The method of claim 244 wherein said desired substituent is selected from the group consisting of alkyl groups having from about 1 to 6 carbon atoms and aryl groups.

246. (New) The method of claim 244 further comprising:

forming an elongation mixture comprising said platform molecules and one or more additional phenylene rings comprising additional functional groups other than a polymerizable group at para- positions to additional carboxylic group(s) selected from the group consisting of carboxyl groups and reactive derivatives of carboxyl groups; and

exposing said elongation mixture to conditions effective to react said additional carboxylic group(s) with one or more of said terminal groups to produce elongated platform molecules comprising additional phenylene rings comprising said additional

functional group(s) at a position para- to additional ester bond(s).

247. The method of claim 244 wherein one or more of said terminal groups is an amino group.